

### REMARKS

Claims 1-4, 9-11, 14-25, 30-38, 40-41 and 43-44 were previously cancelled. Claims 5-8, 27-29, 39-44, 49, 50, and 52 are hereby cancelled. Claims 53-58 are new. Thus, claims 12, 13, 26, 45-48, 51, and 53-58 are now pending in this application; of which, claims 12, 13 and 51 are the independent claims. Claims 5-8, 12-13, 26-27, 39, 42 and 45-52 are rejected.

### Claim Objections

Claim 49 was objected to as failing to limit the subject matter of a previous claim. Claim 49 has been cancelled, thereby mooting this objection.

### Rejections Under 35 U.S.C. §112, Second Paragraph

Claims 39, 42, 26-29 and 7-8 were rejected under 35 U.S.C. §112, second paragraph as being indefinite because it was contended that the dependent claims contradicted the parent claims (i.e., by mentioning size as also being indicative of altitude when parent claims stated shape was exclusive or sole indicator of altitude) and/or failed to correct deficiencies in the parent claims. Claims 39, 53, 27-29, and 7-8 have been cancelled, mooting the rejection of those claims. As for claim 26, claim 26 has been amended to depend from claim 13 (which has not been rejected herein under 35 USC 112, second paragraph), and has been further amended herein to eliminate any reference to the size of the icon as being indicative of altitude. Therefore, Applicants believe that the rejection of claim 26 under 35 U.S.C. §112 second paragraph has been overcome. Accordingly, Applicants respectfully request that the rejection of claims 39, 42, 26-29 and 7-8 were rejected under 35 U.S.C. §112, second paragraph, be withdrawn.

### The Rejections under 35 U.S.C. §103(a)

#### Rejections over Hancock1 in view of Hancock2

The Examiner rejects Claims 5-8, 12-13, 26-27, 39, 42, and 45-52 under 35 U.S.C. §103(a) as being unpatentable over Hancock1 (US 5227786) in view of Hancock2 (US 5179377). Claims 5-8, 27, 39, 42, and 52 have been cancelled herein, thereby mooting the

rejection of those claims. Thus, the remaining claims rejected under 35 U.S.C. §103(a) are claims 12-13, 26, and 45-49.

#### Rejection of Independent Claim 12

Claim 12, as amended herein, recites (emphasis added):

A system for conveying aircraft altitude to a human observer, the system comprising:  
a processor continuously receiving latitude, longitude, and altitude information relating to an aircraft, the altitude information including information enabling determination of a numeric value for an altitude for the aircraft, wherein the processor determines, based on the numeric value of the altitude information, a shape for an icon representing the aircraft, wherein the shape is associated with at least a distinct numeric altitude range and is the sole displayed indicator of the numeric value of the altitude of the aircraft; and  
a display in operable communication with the processor, the display providing a two-dimensional planar view and having a first axis representing latitude and a second axis representing longitude, wherein the processor directs the display to present the icon at a position on the display indicative of the latitude and longitude of the aircraft, wherein the shape of the displayed icon is the sole displayed indicator of information indicating at least a numeric range for the altitude of the aircraft, and wherein the processor directs the display to change the shape of the icon in response to receiving a change in the altitude information.

As claim 12 specifically states, the shape that is displayed provides a very specific type of altitude information - information that indicates, by shape alone, at least a numeric range for the actual aircraft altitude. This aspect of the invention is explained more clearly at pages 4, line 27 through page 7, line 17, of Applicants' Specification as filed.

One of skill in the art will readily appreciate the advantages of this aspect of the invention can provide in a cognitively demanding application, such as air traffic control. Consider a system implemented in accordance with claim 1, where certain shapes are assigned to certain altitude ranges; for example, under 17,500 ft could be represented by a square, 17,500-22,500 a circle, 22,500 - 27,500 a triangle, 27,500- 32,500 a diamond, and over 32,500 an elongated rectangle. Using such a system, an air traffic controller can glance at his or her display and determine rapidly, by viewing shapes alone, approximately how many aircraft are flying at each

altitude (as well as determining other location information about the aircraft based on the position on the display). If, for example, the examiner is concerned with monitoring lower altitude traffic in a given space, to see if the area is clear for a landing or takeoff, the controller can quickly review the corresponding sector of the display to see how many "squares" (i.e., lower flying aircraft) are there, and collisions can be more quickly averted. As Applicants mention on page 6, line 29 through page 7, line 18, this type of "rapid analog comparison" is possible because differences and similarities in shape are "encoded efficiently and in parallel in the human visual system."

In contrast, Hancock1 is directed to providing an "out of the window" type of view for of a pilot of an aircraft, where the pilot is provided with front and rear views so that the pilot "can quickly interpret the overall traffic situation surrounding their own aircraft without going through complex cognitive processing." (col. 3, lines 15-25). Hancock1 makes some use of shape as a visual indicator of certain general aspects of altitude information, as the Examiner points out via the cited passages. **Hancock1 does not, however, use shape to indicate the same information that is recited in claim 12 (i.e., numeric altitude information).** Rather, Hancock1 only uses shape to indicate so-called "vertical tendency," which is explained in Hancock1 to be information indicating whether an aircraft is ascending, descending, has a constant altitude, or has an unknown altitude (see Hancock1 at col. 4, lines 29-37). Moreover, even though Hancock1 mentions that shape can indicate that the altitude of an aircraft is "constant," or "unknown," Hancock does not use shape to provide or display any more particular information as to the actual numeric value of the altitude, as required by claim 12, as amended.

Hancock1 never teaches (or even suggests) that the shape can give any indication whatsoever of any type of numeric values, especially numeric altitude information, whether a discrete numeric value or a numeric range of values. This is because Hancock1 expressly teaches using a different non-shape display feature (namely, the gridlines of the display) to provide and display altitude information that can convey numerical information about altitude.

See, for example, Hancock1 at col. 4, lines 5-22, where Hancock1 states that each horizontal grid line on the display represents a constant altitude differential relative to the pilot's aircraft. For instance, Hancock1 refers to FIG. 2B, where the middle line horizontal grid line corresponds to a location 28 just behind the pilot's aircraft at 0 ft relative altitude, and the traffic symbol 30 is shown as having a slightly higher relative altitude than the pilot's aircraft because it is positioned above the 0 ft gridline. Nothing about the shape of the traffic symbol 30 of Hancock1 provides any indication whatsoever of numeric altitude. At best, the inverted triangle in the shape indicates merely that the traffic symbol 30 is "descending" - an example of a "vertical tendency."

As explained below, Hancock2 does not compensate for the deficiencies of Hancock1. Hancock2 expressly states (see, e.g., claim 1) that the aircraft altitude is represented three ways, none of which uses shape to indicate numeric altitude: (1) via an altitude symbol connected to the aircraft traffic symbol for indicating a direction of altitude change of the traffic entity; (2) via a scaled altitude line connected from said traffic symbol to said disk symbol for indicating altitude of the traffic entity relative to the own craft; and (d) via a numeric symbol proximate to the aircraft traffic symbol for redundant indication of altitude of the traffic entity relative to the own craft. Hancock2 provides a numeric indication of altitude, but not using shape, and uses an (overlaid) shape to indicate direction of altitude change, but not the numeric indication of altitude, as required by claim 12, as amended

Thus, for at least the above reasons discussed in connection with claim 12, Applicants maintain that claim 12 (and all claims dependent therefrom; namely claims 45, 46, 55, 57, and 58) are patentably distinguishable over the art or record, taken alone or in combination. Accordingly, Applicants respectfully request that the rejection of claims 12, 45, and 46 under 35 §103(a) be removed.

### Rejection of Independent Claim 13

Applicants submit that claim 13, as amended, also is patentably distinct over Hancock1 in view of Hancock2, for at least the same reasons given for claim 12, above, because neither of these references, taken alone or in combination, provides the invention as recited in claim 13, as amended:

A method of conveying location of an object, the method comprising:

receiving location information continuously regarding the object, the location information including a first coordinate  $x$ , a second coordinate  $y$ , and a third coordinate  $z$ , wherein the third coordinate  $z$  represents a value associated with a numeric value for an altitude of the object;

correlating the first and second coordinates ( $x,y$ ) with a location of an icon on a display, the display providing a two-dimensional planar view and having a first axis representing the  $x$  coordinate and a second axis representing the  $y$  coordinate;

correlating the third coordinate  $z$  with a shape of the icon, wherein the icon shape is associated with at least a distinct numeric altitude range and is exclusively indicative, on the display, of the value of the third coordinate  $z$ ; and

displaying the icon on the display, wherein the shape of the displayed icon changes in response to received changes in the value of the third coordinate  $z$ , and wherein the displayed icon has a position on the display indicative of the first and second coordinates ( $x,y$ ).

In particular, claim 13 requires receiving “a *third coordinate  $z$ , wherein the third coordinate  $z$  represents a value associated with a numeric value for an altitude of the object,*” and also requires “*correlating the third coordinate  $z$  with a shape of the icon, wherein the icon shape is associated with at least a distinct numeric altitude range and is exclusively indicative, on the display, of the value of the third coordinate  $z$ .*”

The limitations recited in the method of claim 13, as amended, are similar to those of the system of claim 12, as amended, and were rejected on the same grounds. Accordingly, Applicants hereby repeat their arguments made above in connection with responding to and arguing over the rejection of claim 12, as amended.

Thus, for at least the above reasons discussed in connection with claim 12, Applicants maintain that claim 13 (and all claims dependent therefrom; namely claims 26, 47, and 48) are patentably distinguishable over the art or record, taken alone or in combination. Accordingly, Applicants respectfully request that the rejection of claims 12, 26, 47, and 48 under 35 U.S.C. §103(a) be removed.

#### Rejection of Independent Claim 51

Applicants submit that claim 13, as amended, also is patentably distinct over Hancock1 in view of Hancock2, for at least the same reasons given for claim 12, above, because neither of these references, taken alone or in combination, provides the invention as recited in claim 13, as amended:

A method of conveying aircraft information visually to a user, the method comprising:  
continuously receiving latitude, longitude, and altitude information relating to an aircraft;  
selecting an icon to represent one of latitude, longitude, and altitude, wherein the shape of the icon, by itself, is capable of conveying visually to a user at least a range of numeric values for the selected one of latitude, longitude, and altitude information;  
presenting the icon to a user on a display, wherein the shape of the icon is the only way that information about at least the range of numeric values for the respective one of latitude, longitude, and altitude information is visually conveyed to the user, and wherein the icon is presented on a position on the display indicative of the other two of latitude, longitude, and altitude of the aircraft; and  
in response to receiving a change in the respective one of latitude, longitude, and altitude information, changing the shape of the icon, wherein the change in shape is discriminable to the user, and wherein the changed shape of the icon, by itself, is the only way the change in the value of the respective one of latitude, longitude, and altitude information is visually conveyed to the user.

The limitations recited in the method of claim 51, as amended, are similar to those of the system of claim 12, as amended, and were rejected on the same grounds. Accordingly, Applicants hereby repeat their arguments made above in connection with responding to and arguing over the rejection of claim 12, as amended.

Thus, for at least the above reasons discussed in connection with claim 12, Applicants maintain that claim 51 (and all claims dependent therefrom; namely claims 53, and 54) are patentably distinguishable over the art or record, taken alone or in combination. Accordingly, Applicants respectfully request that the rejection of claim 51 under 35 §103(a) be removed.

Rejections over Hancock1 in view of Hancock2, in further view of Azuma

Claims 28-29 stand rejected under 35 USC 103(a) as unpatentable over Hancock in view of Hancock2 as applied to claim 13 above, and further in view of Azuma et al ("Visualization Tools for Free Flight Air-Traffic Management"). Claims 28 and 29 have been cancelled, thereby mooted this rejection. Accordingly, Applicants respectfully request that the rejection of claims 28 and 29 be withdrawn.

Newly added claims

Newly added dependent claims 53-58 have support throughout the specification as filed and depend from independent claims 12, 13, and/or 51, which are each believed to be allowable. Thus, Applicants submit that Claims 53-58 are allowable over the cited references of record in this case at least for the reasons discussed above in conjunction with Claim 12. Applicants also believe that newly added claims 53-58 contain allowable subject matter and should not require additional searching and consideration. Consideration of new Claims 53-58 is respectfully requested.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for withdrawing the prior art cited with regards to any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as intent to concede any issue with regard to any claim, except as

specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Applicants submit that the entire application is now in condition for allowance. Such action is respectfully requested at the Examiner's earliest convenience. The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Amendment and Response or this application. All correspondence should be directed to the address below. Applicants' attorney can be reached by telephone at (781) 401-9988 ext. 122.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845 (referencing Attorney Docket: RTN-173PUS), including but not limited to, any charges for extensions of time under 37 C.F.R. §1.136.

Respectfully submitted,

Respectfully submitted,

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